**R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**M.Tech I - Semester Examinations, March/April-2011**
**TRANSFORM TECHNIQUES**
**(SYSTEMS AND SIGNAL PROCESSING)**

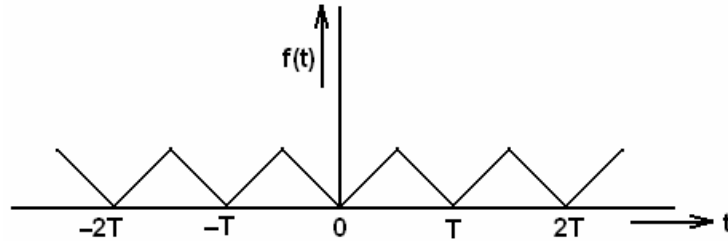Time: 3hours                                                              Max. Marks: 60

**Answer any five questions**
**All questions carry equal marks**
**- - -**

1.a) Determine the Fourier series of the following function.



b) Find the Inverse Z-transform of the following:

$$H(z) = \frac{z-1}{z^2 - 3z + 2}.$$                                      [12]

2.a) Find DCT of the following matrix

$$f = \begin{bmatrix} x & 3 & 4 \\ 5 & 3 & 6 \\ 2 & 4 & 1 \end{bmatrix}$$

b) Define Hoar function and write 4 x 4 Hoar matrix.                     [12]

3.a) Why wavelets are needed? What are the required conditions for a functional to be act as wavelet?
b) What is STFT? How it related to CWT?                                   [12]

4.a) What is MRA? How a function can be estimated band on MRA?
b) Write some examples for CWT.
c) What is scaling function? How it related to wavelet function?          [12]

5.a) Draw the two-level filter bank structure for DWT and derive the required conditions.
b) Explain the significance of decimation in wavelet decomposition.       [12]

6.a) How the Bi-orthogonal pair of filters used for a function reconstruction?
b) How multi-wavelets are used to estimate a function?                    [12]

7.a) Explain how a DCT is used for signal compression.
b) Which transform is used for sub-band coding of speech? How?           [12]

8. Write short notes on:
a) Wavelet packets
b) Lifting scheme.                                                        [12]

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